

WHAT IS CLAIMED:

1. A safety needle comprising:

a needle with a sharp end: and

a needle shield comprising:

collapsible interlocking members, wherein one member is an end member with a hole surrounding the needle;

a spring inside the collapsible interlocking members that applies an expanding force on the collapsible interlocking members;

a releasable latch structure that retains the collapsible interlocking members in a collapsed state, wherein when the releasable latch structure is actuated the collapsible interlocking members expand and enclose the sharp end of the needle; and

a closing structure that prevents the sharp end of the needle from exiting the hole after the collapsible interlocking members encloses the sharp end of the needle.
2. The safety needle of claim 1, wherein the closing structure includes a flip cap and the flip cap has a flip cap hole that is offset from a central axis of the flip cap and wherein the flip cap engages the spring.
3. The safety needle of claim 1, wherein the closing structure includes a slide cap with a hole.

4. The safety needle of claim 3, wherein the slide cap includes a tubular structure engaging the spring and includes a sloped end that engages a ramp on the inside of the end member.

5. The safety needle of claim 1, wherein the closing structure includes a twist cap with a hole in one end offset from the center of the end.

6. The safety needle of claim 5, wherein:
the twist cap has a tubular structure and engages the spring;
the twist cap has a plurality of ramps on a end, and the ramps are along a periphery of the end;
the end member has a plurality of ramps on the inside that complement the ramps on the twist cap.

7. The safety needle of claim 1, wherein the closing structure includes overlapping disks where in each disk has a hole offset from the center of the disk.

8. The safety needle of claim 7, wherein closing structure further includes a spring attached to each of the overlapping disks and the spring applies a force on the disks to rotate the disks relative to one another and causing the holes in the overlapping disks to become unaligned.

9. The safety needle of claim 1, wherein the closing structure includes a clip with two arms and two tabs.

10. The safety needle of claim 9, wherein the clip applies a spring force on the arms to grip the needle.

11. The safety needle of claim 1, wherein the end of the end member is at an angle with respect to the needle to better align with the skin of a patient.

12. The safety needle of claim 1, wherein the shield includes an identifying mark to show the orientation of a bevel on the needle.

13. The safety needle of claim 1, wherein the latch structure after actuation becomes disabled to prevent rearming the needle.

14. The safety needle of claim 1, wherein the closing structure includes two arms bent downward.

15. The safety needle of claim 14, wherein the arms are made of an elastic material.

16. The safety needle of claim 14, wherein the closing structure includes springs biasing the two arms upward.

17. The safety needle of claim 1, wherein the closing structure includes an elastic strip bent downward.

18. The safety needle of claim 1, wherein the safety needle is operated with one hand.

19. A safety needle comprising:

a needle with a sharp end and a base; and

a needle shield comprising:

a member with a hole surrounding the needle;

a spring inside the member that applies an expanding force on the member;

a retaining structure that retains the member near the base of the needle, wherein when the retaining structure is actuated the spring expands and encloses the sharp end of the needle with the member; and

a closing structure that prevents the sharp end of the needle from exiting the hole after the member encloses the sharp end of the needle.

20. The safety needle of claim 19, wherein the closing structure includes a flip cap and the flip cap has a flip cap hole that is offset from a central axis of the flip cap and wherein the flip cap engages the spring.

21. The safety needle of claim 19, wherein the closing structure includes a slide cap with a hole.

22. The safety needle of claim 21, wherein the slide cap includes a tubular structure engaging the spring and includes a sloped end that engages a ramp on the inside of the end member.

23. The safety needle of claim 19, wherein the closing structure includes a twist cap with a hole in one end offset from the center of the end.

24. The safety needle of claim 23, wherein:
the twist cap has a tubular structure and engages the spring;
the twist cap has a plurality of ramps on a end, and the ramps are along a periphery of the end;
the member has a plurality of ramps on the inside that complement the ramps on the twist cap.

25. The safety needle of claim 19, wherein the closing structure includes overlapping disks where in each disk has a hole offset from the center of the disk.

26. The safety needle of claim 25, wherein closing structure further includes a spring attached to each of the overlapping disks and the spring applies a force on the

disks to rotate the disks relative to one another and causing the holes in the overlapping disks to become unaligned.

27. The safety needle of claim 19, wherein the closing structure includes a clip with two arms and two tabs.

28. The safety needle of claim 27, wherein the clip applies a spring force on the arms to grip the needle.

29. The safety needle of claim 19, wherein the end of the end member is at an angle with respect to the needle to better align with the skin of a patient.

30. The safety needle of claim 19, wherein the shield includes an identifying mark to show the orientation of a bevel on the needle.

31. The safety needle of claim 19, wherein the retaining structure after actuation becomes disabled to prevent rearming the needle.

32. The safety needle of claim 19, wherein the closing structure includes two arms bent downward.

33. The safety needle of claim 32, wherein the arms are made of an elastic material.

34. The safety needle of claim 33, wherein the closing structure includes springs biasing the two arms upward.

35. The safety needle of claim 19, wherein the closing structure includes an elastic strip bent downward.

36. The safety needle of claim 19, wherein the safety needle is operated with one hand.

37. A method of using a safety needle comprising:
inserting a needle into a patient;
releasing a needle shield;
removing the needle from the patient; and
enclosing the needle in needle shield as the needle is removed and wherein a closing structure prevents the enclosed needle from exiting the needle shield.

38. The method of claim 37, wherein inserting and releasing uses one hand.

39. The method of claim 37, wherein enclosing the needle includes moving the needle shield along the needle with a spring.

40. The method of claim 37, wherein releasing the needle shield includes preventing the needle shield from being retained again.